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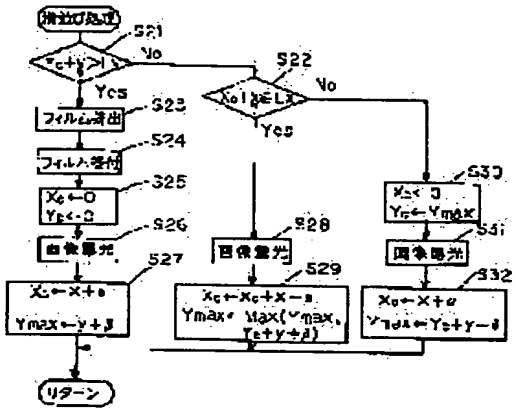
(54) IMAGE RECORDER

(57)Abstract:
PURPOSE: To record plural images on a recording medium limited in size with good spatial efficiency.
CONSTITUTION: An output machine is a device for successively recording plural images on a photosensitive film. When the arraying direction of the image on the photosensitive film is designated from a control panel, in this recorder, the recording start position P(Xc, Yc) of the image is decided based on the designated arraying direction (horizontal arrangement or vertical arrangement) and the recording size (x, y) of the image. Then, the image is recorded from a decided recording start position by an exposing part.



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CLAIMS

[Claim(s)]
[Claim 1] An array direction acquisition means to acquire the array direction on said record medium of said image in the image recording equipment which records two or more images on a record medium one by one, image recording equipment equipped with a starting position decision means by which the array direction acquired by said array direction acquisition means and the record size of said image determine the recording start location of each image, and a record means to record said image from the recording start location determined with said starting position decision means.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to image recording equipment and the image recording equipment which records two or more images on a record medium one by one especially.
[0002]
[Description of the Prior Art] The image recording equipment for platemaking called an imagesetter and an output scanner carries out sequential exposure record of two or more images at the sensitive film (it is only hereafter described as a film) which is a record medium. Since two or more of these images have various record size, if the record location of each image is not determined taking the record size of two or more images into consideration, its field by which image formation is not carried out will increase, consequently its useless part of a film will increase.
[0003] Then, it is possible to prepare the memory which can record image data on image recording equipment in large quantities, to once memorize two or more image data in the memory, and to record an image one by one according to the record location which determined the record location of the image of these plurality with the record size of image data, and was determined after that. However, since a record location cannot be determined unless the size of two or more images of all is known required [mass memory], this takes long duration by the recording start.
[0004] For this reason, with conventional image recording equipment, the image formation field of a film is divided into an one direction, and two or more images are arranged and recorded one by one along that division field. That is, the array direction of the record image to a film is fixed, it meets in the array direction, and the image is assigned one by one.
[0005]
[Problem(s) to be Solved by the Invention] However, with conventional image recording equipment, since the array direction of a record image was being fixed, the non-record sections by which image formation is not carried out depending on the record size of an image may increase in number, and a film may become useless. for example, it is shown in drawing 8 -- as -- two or more image data I1-I8 -- if the record size of each one direction (for example, the main scanning direction Y) is almost the same, and the sequential record images I1-I8 are arranged to a main scanning direction Y as shown in drawing 9 when the size of the other directions (for example, the direction X of vertical scanning) is various, the non-record section shown by hatching to the service area EA of a film will become large, and a useless part will increase. Therefore, only six images I1-I6 can be recorded on the film of one sheet, but the two remaining images I7-I8 must be recorded on the following film. For this reason, a film is consumed vainly.
[0006] When recording the image of size as shown in drawing 8 , as shown in drawing 10 , the non-record section which the way which arranges images I1-I8 in the direction X of vertical scanning shows by hatching, i.e., the useless part of a film, decreases, and all the images I1-I8 can be recorded on the film of one sheet. In case the purpose of this invention records two or more images on the record medium with which magnitude was limited, it is to enable it to use a record medium effectively without futility.
[0007]
[Means for Solving the Problem] The image recording equipment concerning this invention is equipment which records two or more images on a record medium one by one, and is equipped with the array direction acquisition means, the starting position decision means, and the record means. The array direction acquisition means acquires the array direction on said record medium of an image. A starting position decision means determines

the recording start location of an image with the array direction and the record size of an image which were obtained by the array direction acquisition means. A record means records an image from the recording start location determined with the starting position decision means.
[0008]
[Function] With the image recording equipment concerning this invention, if the array direction on said record medium of an image is acquired by the array direction acquisition means in case two or more images are recorded on a record medium one by one, a starting position decision means will determine the recording start location of an image with the array direction and the record size of an image which were obtained. And a record means records an image from the recording start location determined with the starting position decision means.
[0009] Here, since the array direction of an image is acquired, an image starting position is defined according to the array direction and the record size of an image which were obtained and an image is recorded on a record medium, an image can be efficiently arranged to the record medium with which magnitude was limited, and the useless part of a record medium can be lessened.
[0010]
[Example]
The block diagram 1 of image recording equipment shows the output machine 50 for the platemaking as image recording equipment by one example of this invention. The output machine 50 mainly has the box-like body case 51, the film feed zone 52 arranged at the tooth-back side (drawing 1 near side) of the body case 51, and the exposure section 53 which exposes the film supplied from the film feed zone 52, and records an image on a film. The configuration exposure section 53 of the exposure section consists of an exposure head 3 which exposes the cylinder 1 which equips a peripheral face with the supplied film 2, the motor 12 which carries out the rotation drive of the cylinder 1 in a main scanning direction Y, and the film 2 held at the cylinder 1 with the light according to image data, and a head migration device 15 in which the exposure head 3 is driven in the direction X of vertical scanning, as shown in drawing 2 . Between the cylinder 1 and the film feed zone 52, the film attachment-and-detachment device which is not illustrated is arranged. A film attachment-and-detachment device performs supply and discharge of the film to a cylinder 1.
[0011] The exposure head 3 consists of movable carriages 7 to which the zoom lens 5, and LED array 4 and zoom lens 5 for carrying out image formation of the image of the light emitting device of LED array 4 which has two or more light emitting devices, and LED array 4 to a film 2 are being fixed. The head migration device 15 consists of a motor 10, a ball thread 8 by which a rotation drive is carried out by the motor 10, one pair of rails 9 (only one side is illustrated) arranged in parallel with the direction X of vertical scanning, and a ball nut (not shown) which it is fixed to a movable carriage 7 and screwed in a ball thread 8. The migration device 15 moves the exposure head 3 in the direction X of vertical scanning by driving a motor 10.
[0012] Motors 10 and 12 output the encoder signals EX and EY from the encoders 11 and 13 which drive control was carried out in response to driving signals VX and VY, and were formed in each. The encoder signals EX and EY show the X coordinate of the exposure location by the exposure head 3, and Y coordinate, respectively. An image can be exposed to the effective image field 20 of a film 2 by carrying out luminescence control of LED array 4 by the above configuration, based on image data, while a cylinder 1 rotates to a main scanning direction Y and the exposure head 3 moves in the direction X of vertical scanning by the motor 10 from a motor 12. In addition, the film 2 with which the image was exposed is developed by the developing machine (not shown).
The control-block Fig. of the output machine 50 is shown in the block diagram 3 of the control section of an output machine.
[0013] The output machine 50 records image data IM outputted from the system 60 which consists of an image reader or an image database on a film 2. This image data IM is expressed in the raster format. Moreover, the output machine 50 and the system 60 are connected through the interface 40. The output machine 50 has CPU30 for control. RAM31, ROM32, and an interface 40 are connected to CPU30 through the system bus 36, and CPU30 controls each load based on the control program stored in the various data and ROM32 which were stored in RAM31.
[0014] in addition, the various data stored in RAM31 are the spacing alpha of the direction of vertical scanning of the array direction **** LAYOUT flag "time it is lining up side-by-side -- the time of "H" and a vertical list -- V" of the record image inputted from a control panel 33, and a record image, the spacing beta of the main scanning direction of a record image, the recording start position coordinate P (Xc, Yc), and the exposure position coordinate Q of the exposure head 3 (Xh, Yh). Here, that an operator should just set up according to the size of an image, the array direction of an image should just choose the array of the direction of vertical

scanning, when the size of the main scanning direction of two or more record images has gathered, and the size of the direction of vertical scanning has, on the other hand, gathered the array of the direction of vertical scanning. Moreover, it cuts and carries out, spacing of ** is shown, and spacing alpha and spacing beta can be set [required in order to separate two or more images recorded on the film 2 of one sheet, respectively] as adjustable by the operator. Moreover, the coordinate P of a recording start point is set up by the operation mentioned later, and the exposure position coordinate Q is always detected by the encoder signals EX and EY from encoders 11 and 13.

[0015] Each load which CPU30 controls is with the memory control section 41 and the LED mechanical component 43 which were connected through the system bus 36, and the motors 10 and 12 connected through a system bus 36 and each driver 35. The memory control section 41 performs control for writing image data IM inputted through an interface 40 from a system 60 in image memory 42, and control for reading image data IM from image memory 42, and outputting to the LED mechanical component 43. The LED mechanical component 42 controls luminescence of LED array 4 according to image data IM outputted from the memory control section 41. Moreover, a control panel 33 and encoders 11 and 13 are also connected to CPU30 through each interface 34 and system bus 36.

[0016] Thus, CPU30 outputs driving signals VX and VY to motors 10 and 12, respectively, and carries out drive control of each motors 10 and 12, and controls the memory control section 41 and the LED mechanical component 43.

outline actuation -- by such configuration, if the size x of the direction of vertical scanning of image data and the size y of a main scanning direction are received from a system 60, CPU30 will determine the recording start point P of an image by the array direction of the record image set up beforehand, and this size x and y, and it will drive motors 10 and 12 so that the exposure location Q of the exposure head 3 may be located in this recording start point P. And an image is exposed in the location determined by carrying out luminescence control of LED array 4 based on image data IM.

The example of allotment in the case of arranging and recording two or more images with which record sizes differ in the direction X of vertical scanning on allotment drawing 4 of a record image is shown.

[0017] The image data of two or more images by which a sequential output is carried out from a system 60 here IM (n) It xn(s). (-- however, n= -- the size of the direction of vertical scanning of 1, 2, --), and image data IM (n) Spacing of the main scanning direction of alpha and an adjoining record image is set to beta for spacing of the direction of vertical scanning of the record image which L(ies) and adjoins [size / of Lx and a main scanning direction] the size of a main scanning direction in the size of the direction of vertical scanning of yn and the effective image field of a film 2.

[0018] The record image RIM (1) based on image data IM (1) is the recording start point P1 about a zero (0 0). The field carried out is exposed. The record image RIM (2) based on following image data IM (2) is the recording start point P2. Although the field shown is exposed, the Y coordinate of the recording start point P2 is the recording start point P1 here. It is the same and X coordinate is the size x1 of the direction X of vertical scanning of image data IM (1). It is the point shifted by the coordinate of having added spacing alpha. Namely,

P2 : (x1+alpha, 0)

It becomes. Consequently, only distance alpha leaves spacing of the direction X of vertical scanning of the record image RIM (1) and the record image RIM (2).

[0019] Next, since the free area of the 1st horizontal-scanning field R1 is small, the record image RIM (3) based on image data IM (3) is recorded on the next 2nd horizontal-scanning field R2. Here in the m-th horizontal-scanning field Rm (m is a positive integer) It is the field which the record image with the same coordinate of the main scanning direction Y of the recording start point P is formed, and is divided by the parting line parallel to the direction of vertical scanning. In the case of drawing 4 , the 1st horizontal-scanning field R1 It is the field where the 2nd horizontal-scanning field R2 contains the record image RIM (3), RIM (4), and RIM (5), including the record image RIM (1) and RIM (2). Therefore, recording start point P3 P3 : (0 Ymax (1)) = (0 y1+beta)

Here, spacing beta is added to the maximum coordinate of the main scanning direction in all the record image fields recorded on the 1st horizontal-scanning field R1 with Ymax (1), and the main maximum coordinate is called hereafter. This is for vacating spacing beta at least between the record images of the 1st horizontal-scanning field R1 and the 2nd horizontal-scanning field R2.

[0020] the following -- the same -- carrying out -- the recording start point P4 of the image data of image data IM (4) and IM (5), and P5 P4 : (x3+alpha, y1+beta)

P5 : (x3+x4+2 and alpha, y1+beta)

It becomes. Furthermore, when recording image data IM (6) on this film 2, if the formula of Ly-Ymax(2) >=y6 is filled, it can record on the 3rd horizontal-scanning field R3, but since it is unrecordable in an effective image field if not filled, it records on the new film 2.
The processing flow which starts one example of this invention at processing flow drawing 5 is shown. This processing flow shows the contents of the control program stored in ROM32.
[0021] First, initial setting is performed at step S1. Here, a LAYOUT flag is arranged at "stable ranking and hierarchy (H)", and the exposure head 3 and a cylinder 1 are arranged at a zero. Moreover, the recording start point P (Xc, Yc) is set as a zero (0 0). At step S2, the array direction (LAYOUT) of the spacing alpha of the direction X of vertical scanning between adjoining record images, the spacing beta of a main scanning direction Y, and the record image which were inputted from the control panel 33 is received, and the received data are stored in RAM31.
[0022] The film feed zone 52 and a film attachment-and-detachment device are controlled by step S3, and a cylinder 1 is equipped with a film 2 at it. In step S4, when it judges whether there was any input of discharge of a film 2 of directions from a control panel 33 and there are directions of discharge of a film 2, it shifts to step S5, a film 2 is discharged from a cylinder 1, and this processing flow is ended.
[0023] When there are no discharge directions of a film 2, it shifts to step S6 from step S4. It waits for directions of the image recording from a system 60 at step S6. When it is judged that there were directions of the image recording from a system 60, it shifts to step S7 and the size x of the direction of vertical scanning of image data IM and the size y of a main scanning direction are received from a system 60. At step S8, in stable-ranking (direction array of vertical scanning) processing (LAYOUT flag = "H"), the array direction of a record image is shifted to step S9 with reference to the LAYOUT flag of RAM31, in vertical list (main scanning direction array) processing (LAYOUT flag = "V"), it shifts to step S10, and it performs image recording. After these processings finish, it waits for return, discharge directions of a film, or directions of the following image recording to step S4.
[0024] The detail of the lining-up-side-by-side processing flow of step S9 is shown in drawing 6 . First, a recording start location judges whether in which case of the following three cases, it corresponds at steps S21 and S22. these three cases -- ** -- the case where an image is recorded on the following film.
** When an image is recorded on a different horizontal-scanning field from said image transcription image.
[0025] ** When an image is recorded on the same horizontal-scanning field as said image transcription image. coming out -- it is -- formula the case where Yc+y>Ly is filled -- the case (step S21 is Yes) of **, and formula Yc+y<=Ly -- and -- the case where Xc+x>Lx is filled -- the case (for step S21, No and step S22 are No) of **, and formula Yc+y<=Ly -- and -- When filling Xc+x<=Lx, it is judged as the case (step S22 is Yes) of **, respectively. It is the coordinate location of the recording start point P at the time of assuming that an image is recorded on the horizontal-scanning field as the record image recorded last time where Xc and Yc are the same here.
[0026] ** a case -- the present and a cylinder 1 -- equipping -- having -- **** -- a film -- two -- **** -- a free area -- being few -- since -- a degree -- in order to record on a film, shift to step S23 from step S21, discharge the film 2 with which the cylinder 1 is equipped, and equip a cylinder 1 with the new film 2 at step S24. Furthermore, at step S25, the recording start point P is changed into a zero, and step S26 performs image exposure. Next, at step S27, the following record image sets up X coordinate Xc of the recording start point P, assuming that it is recorded on the same horizontal-scanning field as the record image recorded at this step S26 (making Xc into x+alpha), and makes the main maximum coordinate Ymax y+beta further. However, Y coordinate Yc of the recording start point P does not need to change.
[0027] ** a case -- last time -- recording -- having had -- record -- an image -- containing -- having -- horizontal scanning -- a field -- **** -- a free area -- being few -- since -- a degree -- in order to record on a horizontal-scanning field, shift to step S30 from step S22, set the recording start point P as a point (0 Ymax), and perform image exposure at step S31. Here, the main maximum coordinate Ymax is the value which added spacing beta to the maximum coordinate of the main scanning direction of the record image of a pre-horizontal-scanning field. Next, at step S32, the following image sets up X coordinate Xc of the recording start point P, assuming that it is recorded on the same horizontal-scanning field as the record image recorded at this step S31 (Xc is made into x+alpha), and makes the main maximum coordinate Ymax Yc+y+beta further. However, it is not necessary to change Y coordinate Yc of the recording start point P like the case of **.
[0028] ** a case -- last time -- recording -- having had -- record -- an image -- containing -- having -- horizontal scanning -- a field -- being the same -- horizontal scanning -- a field -- recording -- a sake -- step

-- shift to step S28 from 22, and perform image exposure by making a coordinate (Xc, Yc) into the recording tart point P as it is. Next, X coordinate Xc of the following recording start point P is set up, assuming that it is ecorded on the same horizontal-scanning field as the record image with which the following image was recorded t this step S29 at step S29 (Xc is made into Xc+x+alpha), and what added spacing beta to the maximum oordinate of a main scanning direction among all the record images of this horizontal-scanning field is further et up as the main maximum coordinate Ymax.

0029] The detail of the vertical list processing flow of step S10 is shown in drawing 7 . Vertical list processings re step S41 - step S52, perform processing of step S21 - step S32 lining up side-by-side, and same rocessing, and replace the X coordinate and Y coordinate in a lining-up-side-by-side processing flow. Here, a ecording start location judges whether in which case of the following three cases, it corresponds at steps S41 nd S42. these three cases -- ** -- the case where an image is recorded on the following film.

0030] ** When an image is recorded on a different vertical-scanning field from said image transcription image. * When an image is recorded on the same vertical-scanning field as said image transcription image. coming out -- it is -- formula the case where Xc+x>Lx is filled -- the case (step S41 is Yes) of **, and formula c+x<=LX -- and -- the case where Yc+y>Ly is filled -- the case (for step S41, No and step S42 are No) of **, nd formula Xc+x<=Lx -- and -- When filling Yc+y<=Ly, it is judged as the case (step S42 is Yes) of **, espectively.

0031] ** a case -- step S -- shift to step S43 from 41, discharge the film 2 with which the cylinder 1 is quipped like the case of ** in a lining-up-side-by-side processing flow, and equip a cylinder 1 with the new film 2 at step S44. Furthermore, at step S45, the recording start point P is changed into a zero, and step S46 erforms image exposure. Next, at step S47, the following image sets Y coordinate Yc of the recording start oint P as y+beta, assuming that it is recorded on the same vertical-scanning field as the record image recorded at this step S46, and makes Xmax x+alpha further. Here, Xmax is equivalent to the main maximum coordinate Ymax at the time of processing lining up side-by-side, and calls the submaximum coordinate hereafter.

0032] ** a case -- step S -- shift to step S50 from 42, set the recording start point P as a point (Xmax, 0) like he case of ** in a lining-up-side-by-side processing flow, and perform image exposure at step S51. Here, the submaximum coordinate Xmax is the value which added spacing alpha to the maximum coordinate of the direction of vertical scanning of the record image of a pre-vertical-scanning field. Next, at step S52, the following image sets Y coordinate Yc of the recording start point P as y+beta, assuming that it is recorded on the same vertical-scanning field as the record image recorded at this step S51, and makes the submaximum coordinate Xmax Xc+x+alpha further.

[0033] ** a case -- step S -- shift to step S48 from 42, and perform image exposure by making a coordinate (Xc, Yc) into the recording start point P as it is like the case of ** in a lining-up-side-by-side processing flow. Next, at step S49, it assumes that the following image is recorded on the same vertical-scanning field, the coordinate (Xc, Yc) of the recording start point P is set up, and what added spacing alpha to the maximum coordinate of the direction of vertical scanning among the record images of this vertical-scanning field is further set up as the submaximum coordinate Xmax. Example] besides [In said example, although this invention was applied to the output machine for platemaking, this invention is applicable to other image recording equipments, such as an image output unit for the mask patterns of the printed circuit board which records two or more images.

[0034]

[Effect of the Invention] Since the array direction of an image is acquired, an image starting position is defined according to the array direction and the record size of an image which were obtained and an image is recorded on a record medium, an image is recordable with the image recording equipment concerning this invention without futility to the record medium with which magnitude was limited, as explained above.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] This invention relates to image recording equipment and the image recording equipment which records two or more images on a record medium one by one especially.

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PRIOR ART

[Description of the Prior Art] The image recording equipment for platemaking called an imagesetter and an output scanner carries out sequential exposure record of two or more images at the sensitive film (it is only hereafter described as a film) which is a record medium. Since two or more of these images have various record size, if the record location of each image is not determined taking the record size of two or more images into consideration, its field by which image formation is not carried out will increase, consequently its useless part of a film will increase.

[0003] Then, it is possible to prepare the memory which can record image data on image recording equipment in large quantities, to once memorize two or more image data in the memory, and to record an image one by one according to the record location which determined the record location of the image of these plurality with the record size of image data, and was determined after that. However, since a record location cannot be determined unless the size of two or more images of all is known required [mass memory], this takes long duration by the recording start.

[0004] For this reason, with conventional image recording equipment, the image formation field of a film is divided into an one direction, and two or more images are arranged and recorded one by one along that division field. That is, the array direction of the record image to a film is fixed, it meets in the array direction, and the image is assigned one by one.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since the array direction of an image is acquired, an image starting position is defined according to the array direction and the record size of an image which were obtained and an image is recorded on a record medium, an image is recordable with the image recording equipment concerning this invention without futility to the record medium with which magnitude was limited, as explained above.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, with conventional image recording equipment, since the array direction of a record image was being fixed, the non-record sections by which image formation is not carried out depending on the record size of an image may increase in number, and a film may become useless. for example, it is shown in drawing 8 -- as -- two or more image data I1-I8 -- if the record size of each one direction (for example, the main scanning direction Y) is almost the same, and the sequential record images I1-I8 are arranged to a main scanning direction Y as shown in drawing 9 when the size of the other directions (for example, the direction X of vertical scanning) is various, the non-record section shown by hatching to the service area EA of a film will become large, and a useless part will increase. Therefore, only six images I1-I6 can be recorded on the film of one sheet, but the two remaining images I7-I8 must be recorded on the following film. For this reason, a film is consumed vainly.
[0006] When recording the image of size as shown in drawing 8 , as shown in drawing 10 , the non-record section which the way which arranges images I1-I8 in the direction X of vertical scanning shows by hatching, i.e., the useless part of a film, decreases, and all the images I1-I8 can be recorded on the film of one sheet. In case the purpose of this invention records two or more images on the record medium with which magnitude was limited, it is to enable it to use a record medium effectively without futility.

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MEANS

[Means for Solving the Problem] The image recording equipment concerning this invention is equipment which records two or more images on a record medium one by one, and is equipped with the array direction acquisition means, the starting position decision means, and the record means. The array direction acquisition means acquires the array direction on said record medium of an image. A starting position decision means determines the recording start location of an image with the array direction and the record size of an image which were obtained by the array direction acquisition means. A record means records an image from the recording start location determined with the starting position decision means.

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OPERATION

[Function] With the image recording equipment concerning this invention, if the array direction on said record medium of an image is acquired by the array direction acquisition means in case two or more images are recorded on a record medium one by one, a starting position decision means will determine the recording start location of an image with the array direction and the record size of an image which were obtained. And a record means records an image from the recording start location determined with the starting position decision means.
[0009] Here, since the array direction of an image is acquired, an image starting position is defined according to the array direction and the record size of an image which were obtained and an image is recorded on a record medium, an image can be efficiently arranged to the record medium with which magnitude was limited, and the useless part of a record medium can be lessened.

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EXAMPLE

[Example]
The block diagram 1 of image recording equipment shows the output machine 50 for the platemaking as image recording equipment by one example of this invention. The output machine 50 mainly has the box-like body case 51, the film feed zone 52 arranged at the tooth-back side (drawing 1 near side) of the body case 51, and the exposure section 53 which exposes the film supplied from the film feed zone 52, and records an image on a film. The configuration exposure section 53 of the exposure section consists of an exposure head 3 which exposes the cylinder 1 which equips a peripheral face with the supplied film 2, the motor 12 which carries out the rotation drive of the cylinder 1 in a main scanning direction Y, and the film 2 held at the cylinder 1 with the light according to image data, and a head migration device 15 in which the exposure head 3 is driven in the direction X of vertical scanning, as shown in drawing 2 . Between the cylinder 1 and the film feed zone 52, the film attachment-and-detachment device which is not illustrated is arranged. A film attachment-and-detachment device performs supply and discharge of the film to a cylinder 1.
[0011] The exposure head 3 consists of movable carriages 7 to which the zoom lens 5, and LED array 4 and zoom lens 5 for carrying out image formation of the image of the light emitting device of LED array 4 which has two or more light emitting devices, and LED array 4 to a film 2 are being fixed. The head migration device 15 consists of a motor 10, a ball thread 8 by which a rotation drive is carried out by the motor 10, one pair of rails 9 (only one side is illustrated) arranged in parallel with the direction X of vertical scanning, and a ball nut (not shown) which it is fixed to a movable carriage 7 and screwed in a ball thread 8. The migration device 15 moves the exposure head 3 in the direction X of vertical scanning by driving a motor 10.
[0012] Motors 10 and 12 output the encoder signals EX and EY from the encoders 11 and 13 which drive control was carried out in response to driving signals VX and VY, and were formed in each. The encoder signals EX and EY show the X coordinate of the exposure location by the exposure head 3, and Y coordinate, respectively. An image can be exposed to the effective image field 20 of a film 2 by carrying out luminescence control of LED array 4 by the above configuration, based on image data, while a cylinder 1 rotates to a main scanning direction Y and the exposure head 3 moves in the direction X of vertical scanning by the motor 10 from a motor 12. In addition, the film 2 with which the image was exposed is developed by the developing machine (not shown).
The control-block Fig. of the output machine 50 is shown in the block diagram 3 of the control section of an output machine.
[0013] The output machine 50 records image data IM outputted from the system 60 which consists of an image reader or an image database on a film 2. This image data IM is expressed in the raster format. Moreover, the output machine 50 and the system 60 are connected through the interface 40. The output machine 50 has CPU30 for control. RAM31, ROM32, and an interface 40 are connected to CPU30 through the system bus 36, and CPU30 controls each load based on the control program stored in the various data and ROM32 which were stored in RAM31.
[0014] in addition, the various data stored in RAM31 are the spacing alpha of the direction of vertical scanning of the array direction **** LAYOUT flag "time it is lining up side-by-side -- the time of "H" and a vertical list -- V" of the record image inputted from a control panel 33, and a record image, the spacing beta of the main scanning direction of a record image, the recording start position coordinate P (Xc, Yc), and the exposure position coordinate Q of the exposure head 3 (Xh, Yh). Here, that an operator should just set up according to the size of an image, the array direction of an image should just choose the array of the direction of vertical scanning, when the size of the main scanning direction of two or more record images has gathered, and the size of the direction of vertical scanning has, on the other hand, gathered the array of the direction of vertical

scanning. Moreover, it cuts and carries out, spacing of ** is shown, and spacing alpha and spacing beta can be set [required in order to separate two or more images recorded on the film 2 of one sheet, respectively] as adjustable by the operator. Moreover, the coordinate P of a recording start point is set up by the operation mentioned later, and the exposure position coordinate Q is always detected by the encoder signals EX and EY from encoders 11 and 13.

[0015] Each load which CPU30 controls is with the memory control section 41 and the LED mechanical component 43 which were connected through the system bus 36, and the motors 10 and 12 connected through a system bus 36 and each driver 35. The memory control section 41 performs control for writing image data IM inputted through an interface 40 from a system 60 in image memory 42, and control for reading image data IM from image memory 42, and outputting to the LED mechanical component 43. The LED mechanical component 42 controls luminescence of LED array 4 according to image data IM outputted from the memory control section 41. Moreover, a control panel 33 and encoders 11 and 13 are also connected to CPU30 through each interface 34 and system bus 36.

[0016] Thus, CPU30 outputs driving signals VX and VY to motors 10 and 12, respectively, and carries out drive control of each motors 10 and 12, and controls the memory control section 41 and the LED mechanical component 43.

outline actuation -- by such configuration, if the size x of the direction of vertical scanning of image data and the size y of a main scanning direction are received from a system 60, CPU30 will determine the recording start point P of an image by the array direction of the record image set up beforehand, and this size x and y, and it will drive motors 10 and 12 so that the exposure location Q of the exposure head 3 may be located in this recording start point P. And an image is exposed in the location determined by carrying out luminescence control of LED array 4 based on image data IM.

The example of allotment in the case of arranging and recording two or more images with which record sizes differ in the direction X of vertical scanning on allotment drawing 4 of a record image is shown.

[0017] The image data of two or more images by which a sequential output is carried out from a system 60 here IM (n) It xn(s). (-- however, n= -- the size of the direction of vertical scanning of 1, 2, --), and image data IM (n) Spacing of the main scanning direction of alpha and an adjoining record image is set to beta for spacing of the direction of vertical scanning of the record image which L(ies) and adjoins [size / of Lx and a main scanning direction] the size of a main scanning direction in the size of the direction of vertical scanning of yn and the effective image field of a film 2.

[0018] The record image RIM (1) based on image data IM (1) is the recording start point P1 about a zero (0 0). The field carried out is exposed. The record image RIM (2) based on following image data IM (2) is the recording start point P2. Although the field shown is exposed, the Y coordinate of the recording start point P2 is the recording start point P1 here. It is the same and X coordinate is the size x1 of the direction X of vertical scanning of image data IM (1). It is the point shifted by the coordinate of having added spacing alpha. Namely, P2 : (x1+alpha, 0)

It becomes. Consequently, only distance alpha leaves spacing of the direction X of vertical scanning of the record image RIM (1) and the record image RIM (2).

[0019] Next, since the free area of the 1st horizontal-scanning field R1 is small, the record image RIM (3) based on image data IM (3) is recorded on the next 2nd horizontal-scanning field R2. Here in the m-th horizontal-scanning field Rm (m is a positive integer) It is the field which the record image with the same coordinate of the main scanning direction Y of the recording start point P is formed, and is divided by the parting line parallel to the direction of vertical scanning. In the case of drawing 4 , the 1st horizontal-scanning field R1 It is the field where the 2nd horizontal-scanning field R2 contains the record image RIM (3), RIM (4), and RIM (5), including the record image RIM (1) and RIM (2). Therefore, recording start point P3 P3 : (0 Ymax (1)) = (0 y1+beta)

Here, spacing beta is added to the maximum coordinate of the main scanning direction in all the record image fields recorded on the 1st horizontal-scanning field R1 with Ymax (1), and the main maximum coordinate is called hereafter. This is for vacating spacing beta at least between the record images of the 1st horizontal-scanning field R1 and the 2nd horizontal-scanning field R2.

[0020] the following -- the same -- carrying out -- the recording start point P4 of the image data of image data IM (4) and IM (5), and P5 P4 : (x3+alpha, y1+beta)

P5 : (x3+x4+2 and alpha, y1+beta)

It becomes. Furthermore, when recording image data IM (6) on this film 2, if the formula of Ly-Ymax(2) >=y6 is filled, it can record on the 3rd horizontal-scanning field R3, but since it is unrecordable in an effective image field

if not filled, it records on the new film 2.
The processing flow which starts one example of this invention at processing flow drawing 5 is shown. This processing flow shows the contents of the control program stored in ROM32.
[0021] First, initial setting is performed at step S1. Here, a LAYOUT flag is arranged at "stable ranking and hierarchy (H)", and the exposure head 3 and a cylinder 1 are arranged at a zero. Moreover, the recording start point P (Xc, Yc) is set as a zero (0 0). At step S2, the array direction (LAYOUT) of the spacing alpha of the direction X of vertical scanning between adjoining record images, the spacing beta of a main scanning direction Y, and the record image which were inputted from the control panel 33 is received, and the received data are stored in RAM31.
[0022] The film feed zone 52 and a film attachment-and-detachment device are controlled by step S3, and a cylinder 1 is equipped with a film 2 at it. In step S4, when it judges whether there was any input of discharge of a film 2 of directions from a control panel 33 and there are directions of discharge of a film 2, it shifts to step S5, a film 2 is discharged from a cylinder 1, and this processing flow is ended.
[0023] When there are no discharge directions of a film 2, it shifts to step S6 from step S4. It waits for directions of the image recording from a system 60 at step S6. When it is judged that there were directions of the image recording from a system 60, it shifts to step S7 and the size x of the direction of vertical scanning of image data IM and the size y of a main scanning direction are received from a system 60. At step S8, in stable-ranking (direction array of vertical scanning) processing (LAYOUT flag = "H"), the array direction of a record image is shifted to step S9 with reference to the LAYOUT flag of RAM31, in vertical list (main scanning direction array) processing (LAYOUT flag = "V"), it shifts to step S10, and it performs image recording. After these processings finish, it waits for return, discharge directions of a film, or directions of the following image recording to step S4.
[0024] The detail of the lining-up-side-by-side processing flow of step S9 is shown in drawing 6 . First, a recording start location judges whether in which case of the following three cases, it corresponds at steps S21 and S22. these three cases -- ** -- the case where an image is recorded on the following film.
** When an image is recorded on a different horizontal-scanning field from said image transcription image.
[0025] ** When an image is recorded on the same horizontal-scanning field as said image transcription image. coming out -- it is -- formula the case where Yc+y>Ly is filled -- the case (step S21 is Yes) of **, and formula Yc+y<=Ly -- and -- the case where Xc+x>Lx is filled -- the case (for step S21, No and step S22 are No) of **, and formula Yc+y<=Ly -- and -- When filling Xc+x<=Lx, it is judged as the case (step S22 is Yes) of **, respectively. It is the coordinate location of the recording start point P at the time of assuming that an image is recorded on the horizontal-scanning field as the record image recorded last time where Xc and Yc are the same here.
[0026] ** a case -- the present and a cylinder 1 -- equipping -- having -- **** -- a film -- two -- **** -- a free area -- being few -- since -- a degree -- in order to record on a film, shift to step S23 from step S21, discharge the film 2 with which the cylinder 1 is equipped, and equip a cylinder 1 with the new film 2 at step S24. Furthermore, at step S25, the recording start point P is changed into a zero, and step S26 performs image exposure. Next, at step S27, the following record image sets up X coordinate Xc of the recording start point P, assuming that it is recorded on the same horizontal-scanning field as the record image recorded at this step S26 (making Xc into x+alpha), and makes the main maximum coordinate Ymax y+beta further. However, Y coordinate Yc of the recording start point P does not need to change.
[0027] ** a case -- last time -- recording -- having had -- record -- an image -- containing -- having -- horizontal scanning -- a field -- **** -- a free area -- being few -- since -- a degree -- in order to record on a horizontal-scanning field, shift to step S30 from step S22, set the recording start point P as a point (0 Ymax), and perform image exposure at step S31. Here, the main maximum coordinate Ymax is the value which added spacing beta to the maximum coordinate of the main scanning direction of the record image of a pre-horizontal-scanning field. Next, at step S32, the following image sets up X coordinate Xc of the recording start point P, assuming that it is recorded on the same horizontal-scanning field as the record image recorded at this step S31 (Xc is made into x+alpha), and makes the main maximum coordinate Ymax Yc+y+beta further. However, it is not necessary to change Y coordinate Yc of the recording start point P like the case of **.
[0028] ** a case -- last time -- recording -- having had -- record -- an image -- containing -- having -- horizontal scanning -- a field -- being the same -- horizontal scanning -- a field -- recording -- a sake -- step S -- shift to step S28 from 22, and perform image exposure by making a coordinate (Xc, Yc) into the recording start point P as it is. Next, X coordinate Xc of the following recording start point P is set up, assuming that it is

recorded on the same horizontal-scanning field as the record image with which the following image was recorded at this step S29 at step S29 (Xc is made into Xc+x+alpha), and what added spacing beta to the maximum coordinate of a main scanning direction among all the record images of this horizontal-scanning field is further set up as the main maximum coordinate Ymax.

[0029] The detail of the vertical list processing flow of step S10 is shown in drawing 7 . Vertical list processings are step S41 - step S52, perform processing of step S21 - step S32 lining up side-by-side, and same processing, and replace the X coordinate and Y coordinate in a lining-up-side-by-side processing flow. Here, a recording start location judges whether in which case of the following three cases, it corresponds at steps S41 and S42. these three cases -- ** -- the case where an image is recorded on the following film.

[0030] ** When an image is recorded on a different vertical-scanning field from said image transcription image. ** When an image is recorded on the same vertical-scanning field as said image transcription image. coming out -- it is -- formula the case where Xc+x>Lx is filled -- the case (step S41 is Yes) of **, and formula Xc+x<=LX -- and -- the case where Yc+y>Ly is filled -- the case (for step S41, No and step S42 are No) of **, and formula Xc+x<=Lx -- and -- When filling Yc+y<=Ly, it is judged as the case (step S42 is Yes) of **, respectively.

[0031] ** a case -- step S -- shift to step S43 from 41, discharge the film 2 with which the cylinder 1 is equipped like the case of ** in a lining-up-side-by-side processing flow, and equip a cylinder 1 with the new film 2 at step S44. Furthermore, at step S45, the recording start point P is changed into a zero, and step S46 performs image exposure. Next, at step S47, the following image sets Y coordinate Yc of the recording start point P as y+beta, assuming that it is recorded on the same vertical-scanning field as the record image recorded at this step S46, and makes Xmax x+alpha further. Here, Xmax is equivalent to the main maximum coordinate Ymax at the time of processing lining up side-by-side, and calls the submaximum coordinate hereafter.

[0032] ** a case -- step S -- shift to step S50 from 42, set the recording start point P as a point (Xmax, 0) like the case of ** in a lining-up-side-by-side processing flow, and perform image exposure at step S51. Here, the submaximum coordinate Xmax is the value which added spacing alpha to the maximum coordinate of the direction of vertical scanning of the record image of a pre-vertical-scanning field. Next, at step S52, the following image sets Y coordinate Yc of the recording start point P as y+beta, assuming that it is recorded on the same vertical-scanning field as the record image recorded at this step S51, and makes the submaximum coordinate Xmax Xc+x+alpha further.

[0033] ** a case -- step S -- shift to step S48 from 42, and perform image exposure by making a coordinate (Xc, Yc) into the recording start point P as it is like the case of ** in a lining-up-side-by-side processing flow. Next, at step S49, it assumes that the following image is recorded on the same vertical-scanning field, the coordinate (Xc, Yc) of the recording start point P is set up, and what added spacing alpha to the maximum coordinate of the direction of vertical scanning among the record images of this vertical-scanning field is further set up as the submaximum coordinate Xmax.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The perspective view of the output machine for the platemaking as image recording equipment by one example of this invention.
[Drawing 2] The perspective illustration of the exposure section.
[Drawing 3] The control-block Fig. of an output machine.
[Drawing 4] Drawing explaining the allotment condition of two or more images.
[Drawing 5] The control flow chart of the Maine processing of CPU.
[Drawing 6] The control flow chart of processing lining up side-by-side.
[Drawing 7] The control flow chart of vertical list processing.
[Drawing 8] Drawing showing an example of the record size of two or more images.
[Drawing 9] The explanatory view when making an image into a vertical list.
[Drawing 10] The explanatory view when lining up an image side-by-side.
[Description of Notations]
30 CPU
33 Control Panel
50 Output Machine
53 Exposure Section

[Translation done.]

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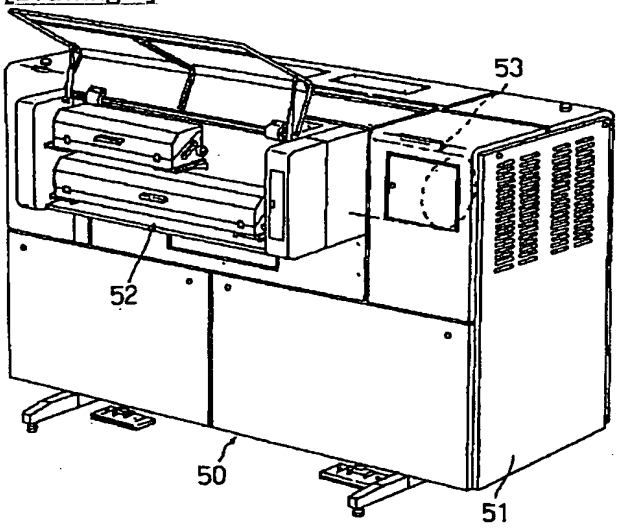
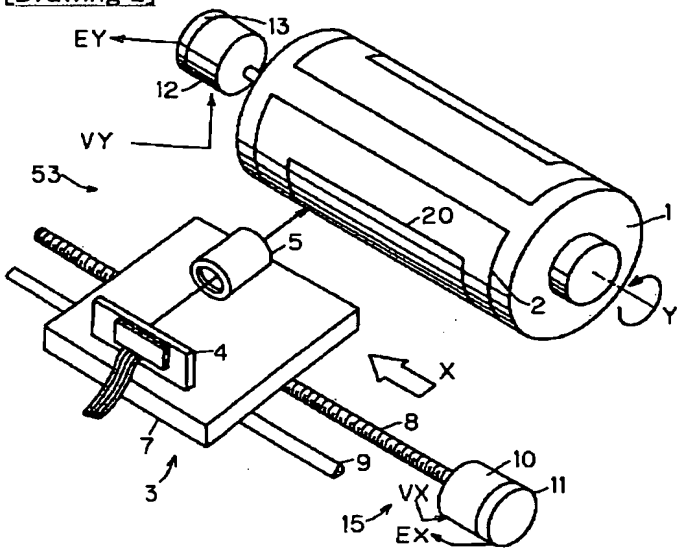
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

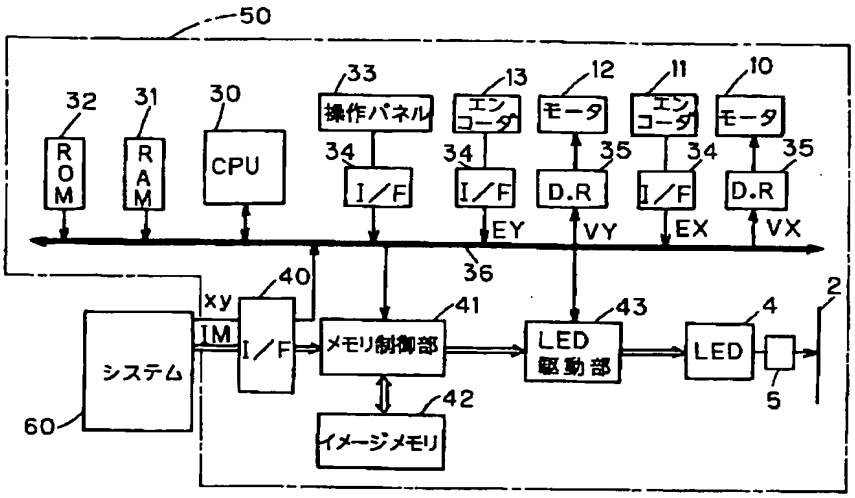
[Drawing 1]



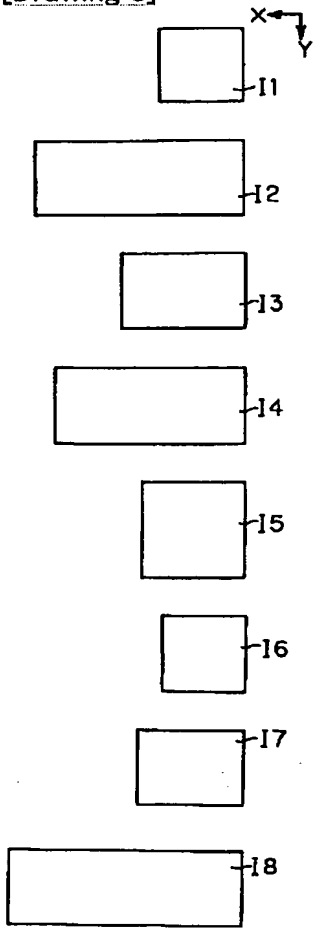
[Drawing 2]



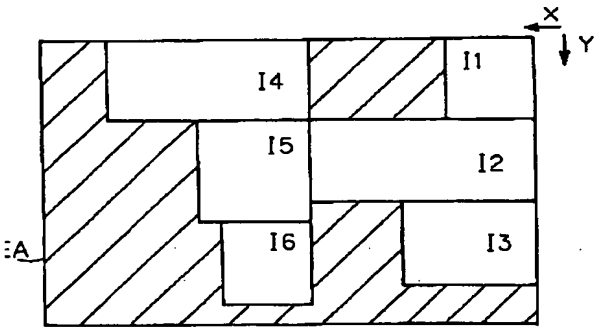
[Drawing 3]



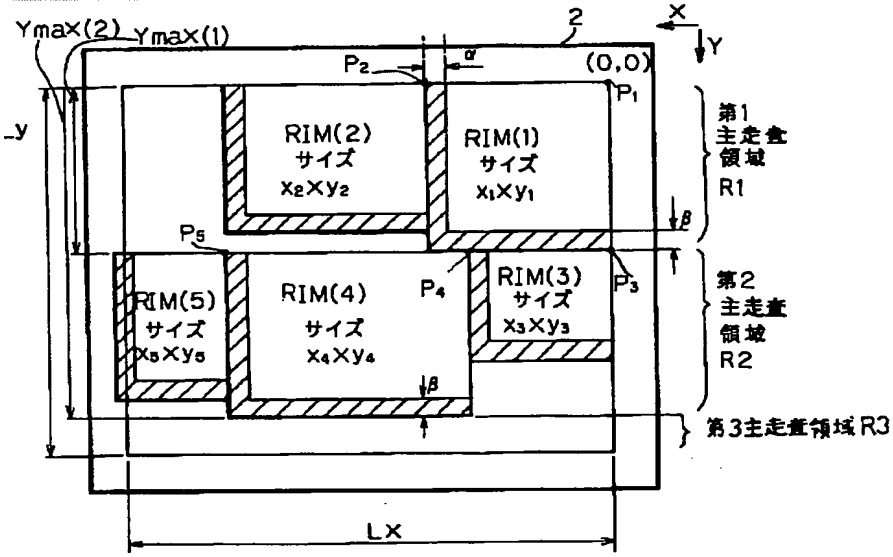
[Drawing 8]



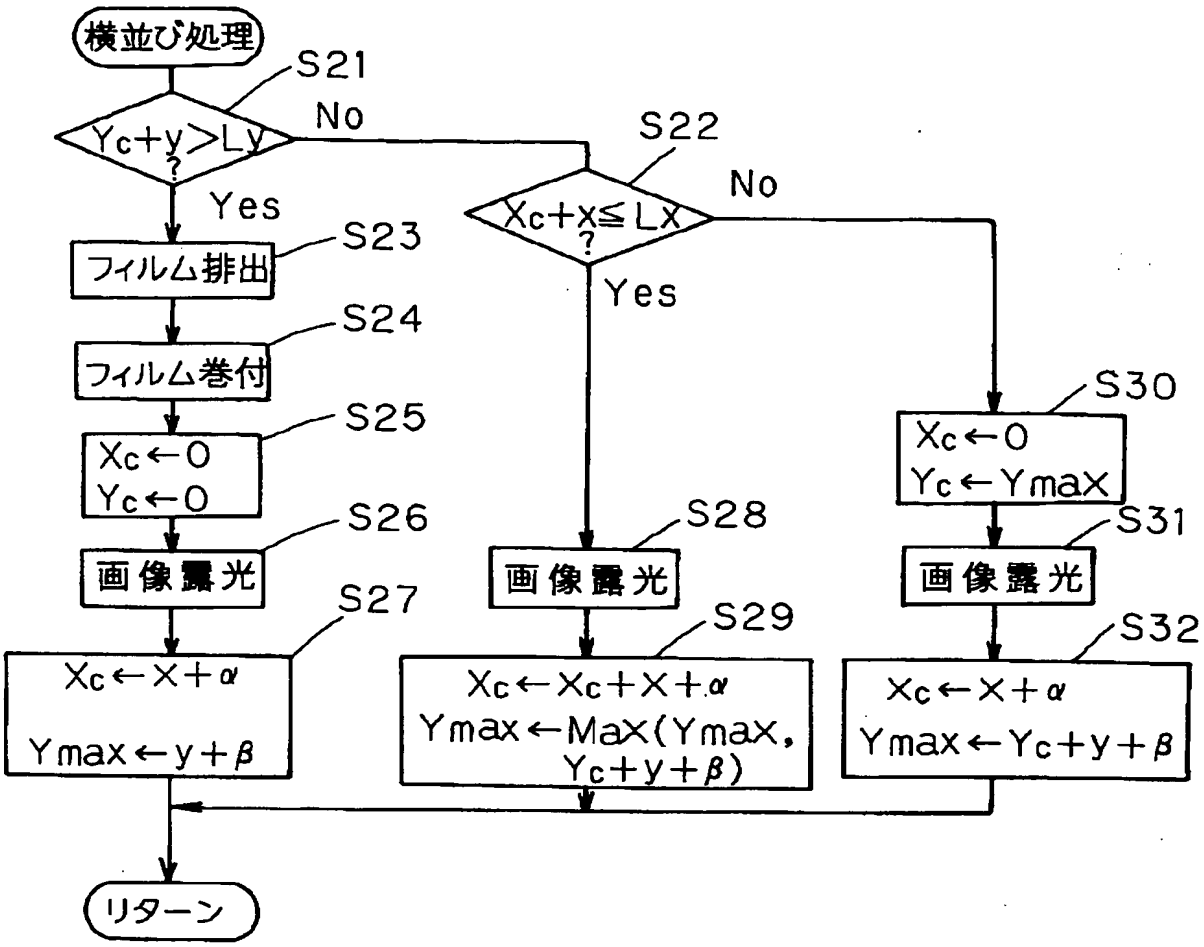
[Drawing 9]



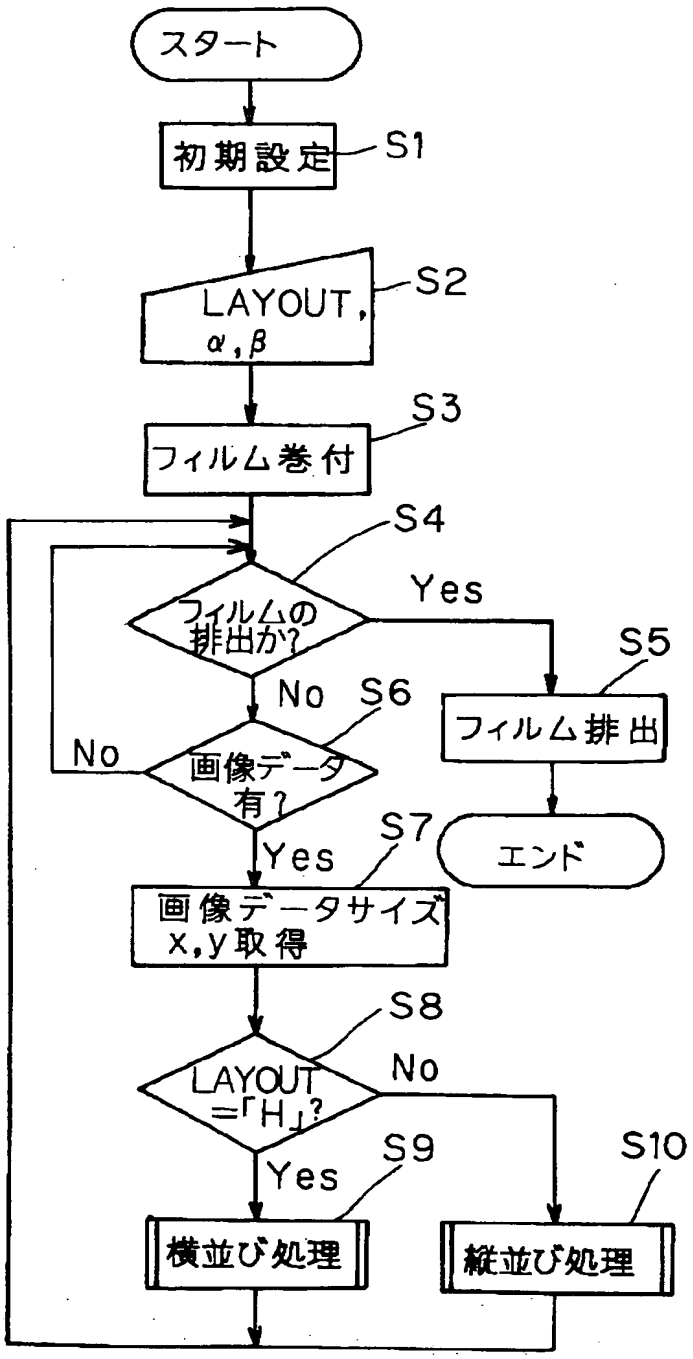
[Drawing 4]



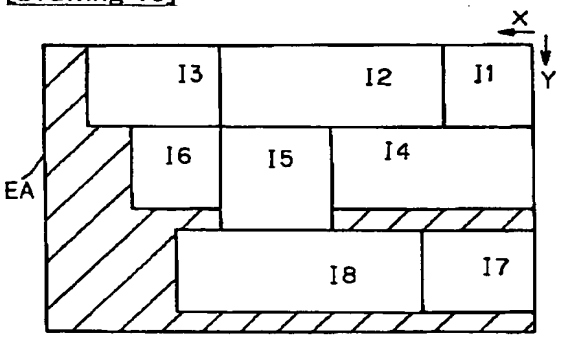
[Drawing 6]


横並び処理
S21
Yc+y>Ly ?
No
Yes
S22
Xc+x≦Lx ?
No
Yes
S23
フィルム排出
S24
フィルム巻付
S25
Xc←0
Yc←0
S26
画像露光
S27
Xc←X+α
Ymax←y+β
S28
画像露光
S29
Xc←Xc+X+α
Ymax←Max(Ymax, Yc+y+β)
S30
Xc←0
Yc←Ymax
S31
画像露光
S32
Xc←X+α
Ymax←Yc+y+β
リターン

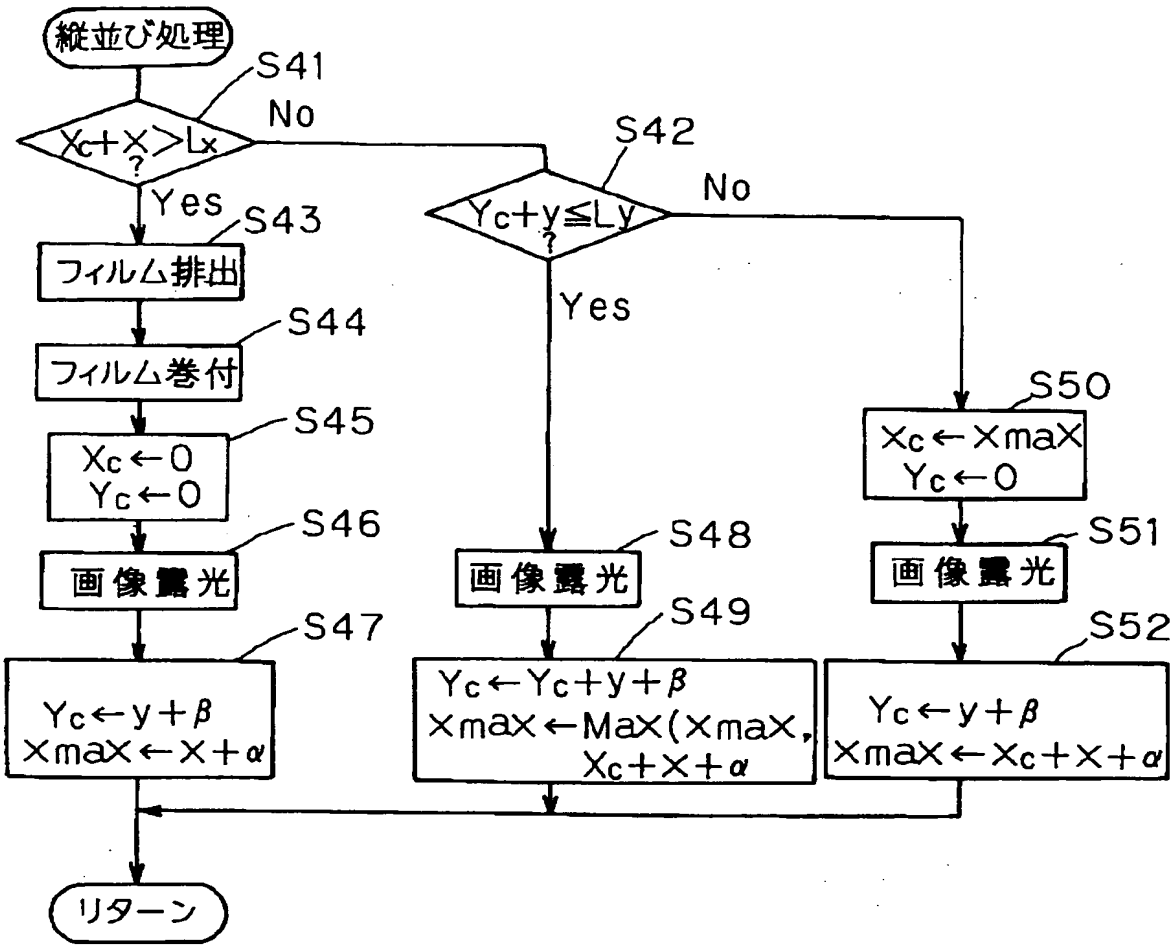
[Drawing 5]



[Drawing 10]



[Drawing 7]



[Translation done.]

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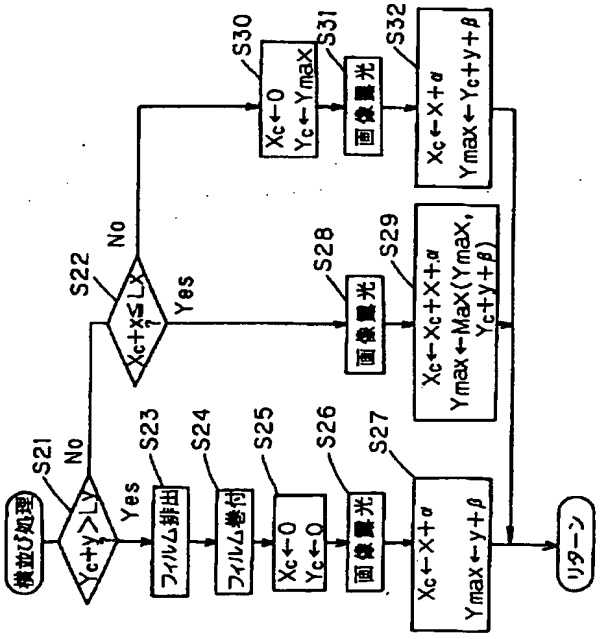
(54)【発明の名称】　画像記録装置

(57)【要約】

【目的】　大きさが限定された記録媒体に複数の画像を空間効率よく記録できるようにする。

【構成】　出力機は、複数の画像を順次感光フィルムに記録する装置である。この装置では、操作パネルから画像の感光フィルム上での配列方向が指定されると、指定された配列方向（横並びまたは縦並び）と画像の記録サイズ（ｘ，ｙ）とにより画像の記録開始位置Ｐ（Ｘｃ，Ｙｃ）が決定される。そして、露光部により、決定された記録開始位置から画像が記録される。



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【特許請求の範囲】
【請求項１】複数の画像を順次記録媒体に記録する画像記録装置において、
前記画像の前記記録媒体上での配列方向を獲得する配列方向獲得手段と、
前記配列方向獲得手段によって得られた配列方向と、前記画像の記録サイズとにより各画像の記録開始位置を決定する開始位置決定手段と、
前記開始位置決定手段で決定された記録開始位置から前記画像を記録する記録手段と、を備えた画像記録装置。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、画像記録装置、特に、複数の画像を順次記録媒体に記録する画像記録装置に関する。
【０００２】
【従来の技術】イメージセッタや出力スキャナと称する製版用の画像記録装置は、記録媒体である感光フィルム（以下、単にフィルムと記す）に、複数の画像を順次露光記録する。この複数の画像は、記録サイズがまちまちであるため、複数の画像の記録サイズを考慮に入れて各画像の記録位置を決定しないと、画像形成されない領域が増え、その結果、フィルムの無駄な部分が多くなる。
【０００３】そこで、画像記録装置に画像データを大量に記録できるメモリを設け、複数の画像データをそのメモリに一旦記憶し、そして、画像データの記録サイズによりそれら複数の画像の記録位置を決定し、その後、決定された記録位置にしたがって順次画像を記録することが考えられる。しかし、これでは、大容量のメモリが必要であり、また、複数の画像全てのサイズが分からないと記録位置を決定できないため記録開始までに長時間を要する。
【０００４】このため、従来の画像記録装置では、フィルムの画像形成領域を一方向に分割し、その分割領域に沿って順次複数の画像を配列して記録している。つまり、フィルムに対する記録画像の配列方向を固定して、その配列方向にそって順次画像を割りつけている。
【０００５】
【発明が解決しようとする課題】しかし、従来の画像記録装置では、記録画像の配列方向が固定されていたため、画像の記録サイズによっては、画像形成されない未記録領域が増え、フィルムが無駄になる場合がある。たとえば、図８に示すように、複数の画像データＩ１～Ｉ８それぞれの一方向（たとえば、主走査方向Ｙ）の記録サイズがほぼ同一であり、他方向（たとえば、副走査方向Ｘ）のサイズがまちまちである場合、図９に示すように主走査方向Ｙに順次記録画像Ｉ１～Ｉ８を配列すると、フィルムの有効領域ＥＡに対してハッチングで示す未記録領域が大きくなり、無駄な部分が多くなる。従って、６つの画像Ｉ１～Ｉ６しか１枚のフィルムに記録できず、残りの２つの画像Ｉ７～Ｉ８は、次のフィルムに記録しなければならない。このため、フィルムを無駄に消費する。

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【０００６】図８に示すようなサイズの画像を記録する場合は、図１０に示すように、副走査方向Ｘに画像Ｉ１～Ｉ８を配列するほうが、ハッチングで示す未記録領域、つまり、フィルムの無駄な部分が少なくなり、全ての画像Ｉ１～Ｉ８を１枚のフィルムに記録できる。本発明の目的は、大きさが限定された記録媒体に複数の画像を記録する際に、記録媒体を無駄なく有効に使用できるようにすることにある。
【０００７】
【課題を解決するための手段】本発明に係る画像記録装置は、複数の画像を順次記録媒体に記録する装置であって、配列方向獲得手段と開始位置決定手段と記録手段とを備えている。配列方向獲得手段は、画像の前記記録媒体上での配列方向を得るものである。開始位置決定手段は、配列方向獲得手段によって得られた配列方向と画像の記録サイズとにより画像の記録開始位置を決定するものである。記録手段は、開始位置決定手段で決定された記録開始位置から画像を記録するものである。
【０００８】
【作用】本発明に係る画像記録装置では、複数の画像を順次記録媒体に記録する際に、配列方向獲得手段により画像の前記記録媒体上での配列方向が得られると、開始位置決定手段が、得られた配列方向と画像の記録サイズとにより画像の記録開始位置を決定する。そして、記録手段が開始位置決定手段で決定された記録開始位置から画像を記録する。
【０００９】ここでは、画像の配列方向を得、得られた配列方向と画像の記録サイズとに応じて画像開始位置が定められ画像が記録媒体に記録されるので、大きさが限定された記録媒体に対して効率よく画像を配置でき、記録媒体の無駄な部分を少なくできる。
【００１０】
【実施例】
画像記録装置の構成
図１は、本発明の一実施例による画像記録装置としての製版用の出力機５０を示している。出力機５０は、箱状の本体ケース５１と、本体ケース５１の背面側（図１手前側）に配置されたフィルム供給部５２と、フィルム供給部５２から供給されたフィルムを露光してフィルムに画像を記録する露光部５３とを主に有している。
露光部の構成
露光部５３は、図２に示すように、供給されたフィルム２を外周面に装着するシリンダ１と、シリンダ１を主走査方向Ｙに回転駆動するモータ１２と、シリンダ１に保持されたフィルム２を画像データに応じた光で露光する露光ヘッド３と、露光ヘッド３を副走査方向Ｘに駆動するヘッド移動機構１５とから構成されている。シリンダ

１とフィルム供給部５２との間には、図示しないフィルム着脱機構が配置されている。フィルム着脱機構はシリンダ１へのフィルムの供給と排出とを行う。

【００１１】露光ヘッド３は、複数の発光素子を有するＬＥＤアレイ４と、ＬＥＤアレイ４の発光素子の像をフィルム２に結像するためのズームレンズ５と、ＬＥＤアレイ４及びズームレンズ５が固定されている移動台７とから構成されている。ヘッド移動機構１５は、モータ１０と、モータ１０により回転駆動されるボールねじ８と、副走査方向Ｘに平行に配置された１対のレール９（一方のみ図示）と、移動台７に固定され、ボールねじ８に螺合するボールナット（図示せず）とから構成されている。移動機構１５は、モータ１０を駆動することにより露光ヘッド３を副走査方向Ｘに移動させる。

【００１２】モータ１０，１２は、駆動信号ＶＸ，ＶＹを受けて駆動制御され、また、それぞれに設けられたエンコーダ１１，１３からエンコーダ信号ＥＸ，ＥＹを出力する。エンコーダ信号ＥＸ，ＥＹは、それぞれ露光ヘッド３による露光位置のＸ座標、Ｙ座標を示している。以上の構成により、モータ１２よりシリンダ１が主走査方向Ｙへ回転し、モータ１０により露光ヘッド３が副走査方向Ｘへ移動するとともに、ＬＥＤアレイ４を画像データに基づいて発光制御することにより、フィルム２の有効画像領域２０に画像を露光することができる。なお、画像が露光されたフィルム２は、現像機（図示せず）により現像される。

出力機の制御部の構成

図３に、出力機５０の制御ブロック図を示す。

【００１３】出力機５０は、画像読取装置あるいは画像データベースからなるシステム６０から出力される画像データＩＭをフィルム２に記録するものである。この画像データＩＭはラスター形式で表現されている。また、出力機５０とシステム６０とはインターフェイス４０を介して接続されている。出力機５０は、制御用のＣＰＵ３０を有している。ＣＰＵ３０には、システムバス３６を介してＲＡＭ３１、ＲＯＭ３２及びインターフェイス４０が接続されており、ＣＰＵ３０は、ＲＡＭ３１に格納された各種データ及びＲＯＭ３２に格納されている制御プログラムに基づいて、各負荷を制御する。

【００１４】なお、ＲＡＭ３１に格納されている各種データとは、操作パネル３３から入力される記録画像の配列方向示すＬＡＹＯＵＴフラグ（横並びのとき「Ｈ」，縦並びのとき「Ｖ」）、記録画像の副走査方向の間隔α、記録画像の主走査方向の間隔β、記録開始位置座標Ｐ（Ｘｃ，Ｙｃ）、及び露光ヘッド３の露光位置座標Ｑ（Ｘｈ，Ｙｈ）である。ここで、画像の配列方向は、オペレーターが、画像のサイズに応じて設定すればよく、複数の記録画像の主走査方向のサイズが揃っている場合は、副走査方向の配列を、一方、副走査方向のサイズが揃っているときは副走査方向の配列を選択すればよい。また、間隔α、間隔βは、１枚のフィルム２に記録された複数の画像をそれぞれ切り離すために必要な切りしろの間隔を示すもので、オペレーターにより可変に設定できる。また、記録開始点の座標Ｐは、後述する演算により設定され、露光位置座標Ｑは、エンコーダ１１，１３からのエンコーダ信号ＥＸ，ＥＹにより常に検出されている。

【００１５】ＣＰＵ３０が制御する各負荷は、システムバス３６を介して接続されたメモリ制御部４１及びＬＥＤ駆動部４３と、システムバス３６及びそれぞれのドライバ３５を介して接続されたモータ１０，１２とである。メモリ制御部４１は、システム６０からインターフェイス４０を介して入力される画像データＩＭをイメージメモリ４２に書き込むための制御と、イメージメモリ４２から画像データＩＭを読み出してＬＥＤ駆動部４３に出力するための制御とを行う。ＬＥＤ駆動部４２は、メモリ制御部４１から出力される画像データＩＭに応じてＬＥＤアレイ４の発光を制御するものである。また、ＣＰＵ３０には、それぞれのインターフェイス３４及びシステムバス３６を介して操作パネル３３、エンコーダ１１，１３も接続されている。

【００１６】このように、ＣＰＵ３０は、モータ１０，１２に駆動信号ＶＸ，ＶＹをそれぞれ出力して、各モータ１０，１２を駆動制御し、また、メモリ制御部４１及びＬＥＤ駆動部４３を制御する。

概略動作

このような構成により、ＣＰＵ３０は、システム６０から画像データの副走査方向のサイズｘ，及び主走査方向のサイズｙを受け取ると、予め設定されている記録画像の配列方向とこのサイズｘ，ｙとにより画像の記録開始点Ｐを決定し、この記録開始点Ｐに露光ヘッド３の露光位置Ｑが位置するようにモータ１０及び１２を駆動する。そして、画像データＩＭに基づいてＬＥＤアレイ４を発光制御して決定された位置に画像を露光する。

記録画像の割り付け

図４に、記録サイズの異なる複数の画像を副走査方向Ｘに配列して記録する場合の割り付け例を示す。

【００１７】ここで、システム６０から順次出力される複数の画像の画像データをＩＭ（ｎ）（ただし、ｎ＝１、２、…）、画像データＩＭ（ｎ）の副走査方向のサイズをx_n、主走査方向のサイズをy_n、フィルム２の有効画像領域の副走査方向のサイズをＬｘ、主走査方向のサイズをＬｙ、隣接する記録画像の副走査方向の間隔をα、隣接する記録画像の主走査方向の間隔をβとする。

【００１８】画像データＩＭ（１）に基づく記録画像ＲＩＭ（１）は、原点（０，０）を記録開始点P_1とした領域に露光される。次の画像データＩＭ（２）に基づく記録画像ＲＩＭ（２）は、記録開始点P_2で示される領域に露光されるのであるが、ここで、記録開始点Ｐ２の

Ｙ座標は、記録開始点P_1と同じであり、Ｘ座標は、画像データＩＭ（１）の副走査方向Ｘのサイズx_1に間隔αを加算した座標分シフトした点である。すなわち、

P_2：（x_1＋α，０）

となる。この結果、記録画像ＲＩＭ（１）と記録画像ＲＩＭ（２）の副走査方向Ｘの間隔は、距離αだけ離れる。

【００１９】次に、画像データＩＭ（３）に基づく記録画像ＲＩＭ（３）は、第１主走査領域Ｒ１の空き領域が小さいので、次の第２主走査領域Ｒ２に記録される。ここで、第ｍ主走査領域Ｒｍ（ｍは正の整数）とは、記録開始点Ｐの主走査方向Ｙの座標が同じ記録画像が形成され、副走査方向に平行な分割線で分割される領域であり、図４の場合、第１主走査領域Ｒ１は、記録画像ＲＩＭ（１）及びＲＩＭ（２）を含み、また、第２主走査領域Ｒ２は、記録画像ＲＩＭ（３）、ＲＩＭ（４）及びＲＩＭ（５）を含む領域である。したがって、記録開始点P_3は、

P_3：（０，Ｙｍａｘ（１））＝（０，$y_1+\beta$）

ここで、Ｙｍａｘ（１）とは、第１主走査領域Ｒ１に記録された全記録画像領域における主走査方向の最大座標に間隔βを加算したものであり、以下、主最大座標と称す。これは、第１主走査領域Ｒ１と第２主走査領域Ｒ２の記録画像との間に少なくとも間隔βを空けるためである。

【００２０】以下、同様にして、画像データＩＭ（４）、ＩＭ（５）の画像データの記録開始点P_4，P_5は、

P_4：（$x_3+\alpha$，$y_1+\beta$）

P_5：（$x_3+x_4+2\cdot\alpha$，$y_1+\beta$）

となる。さらに、画像データＩＭ（６）をこのフィルム２に記録する場合、

Ｌｙ－Ｙｍａｘ（２）≧y_6

の式を満たせば第３主走査領域Ｒ３に記録可能であるが、満たされなければ有効画像領域内に記録することはできないので、新たなフィルム２に記録する。

処理フロー

図５に、本発明の一実施例に係る処理フローを示す。この処理フローは、ＲＯＭ３２に格納されている制御プログラムの内容を示すものである。

【００２１】まず、ステップＳ１で、初期設定を行う。ここでは、ＬＡＹＯＵＴフラグが「横並び（Ｈ）」に、露光ヘッド３及びシリンダ１が原点に配置される。また、記録開始点Ｐ（Ｘｃ，Ｙｃ）は原点（０，０）に設定される。ステップＳ２では、操作パネル３３から入力された、隣接する記録画像間の副走査方向Ｘの間隔α、主走査方向Ｙの間隔β及び記録画像の配列方向（ＬＡＹＯＵＴ）を受け付け、受け付けたデータをＲＡＭ３１に格納する。

【００２２】ステップＳ３では、フィルム供給部５２及びフィルム着脱機構を制御し、フィルム２をシリンダ１に装着する。ステップＳ４では、操作パネル３３からフィルム２の排出の指示の入力があったか否か判断し、フィルム２の排出の指示があった場合は、ステップＳ５に移行し、フィルム２をシリンダ１から排出してこの処理フローを終了する。

【００２３】フィルム２の排出指示がなかった場合はステップＳ４からステップＳ６に移行する。ステップＳ６では、システム６０からの画像記録の指示を待つ。システム６０からの画像記録の指示があったと判断した場合は、ステップＳ７に移行し、システム６０から画像データＩＭの副走査方向のサイズｘ及び主走査方向のサイズｙを受け取る。ステップＳ８では、記録画像の配列方向をＲＡＭ３１のＬＡＹＯＵＴフラグを参照し、横並び（副走査方向配列）処理の場合（ＬＡＹＯＵＴフラグ＝「Ｈ」）はステップＳ９に移行し、縦並び（主走査方向配列）処理の場合（ＬＡＹＯＵＴフラグ＝「Ｖ」）はステップＳ１０に移行し、画像記録を行う。これらの処理が終わると、ステップＳ４に戻り、フィルムの排出指示、または、次の画像記録の指示を待つ。

【００２４】図６にステップＳ９の横並び処理フローの詳細を示す。まず、ステップＳ２１及びＳ２２で、記録開始位置が、次の３つのケースのどの場合に相当するかを判断する。この３つのケースとは、

①次のフィルムに画像を記録する場合。

②前記録画像と異なる主走査領域に画像を記録する場合。

【００２５】③前記録画像と同一の主走査領域に画像を記録する場合。

であり、式　Ｙｃ＋ｙ＞Ｌｙを満たす場合、①のケース（ステップＳ２１がＹｅｓ）、式　Ｙｃ＋ｙ≦Ｌｙかつ　Ｘｃ＋ｘ＞Ｌｘを満たす場合、②のケース（ステップＳ２１がＮｏかつステップＳ２２がＮｏ）、式　Ｙｃ＋ｙ≦Ｌｙかつ　Ｘｃ＋ｘ≦Ｌｘを満たす場合、③のケース（ステップＳ２２がＹｅｓ）、とそれぞれ判断する。ここで、Ｘｃ，Ｙｃとは、前回記録した記録画像と同一の主走査領域に画像を記録すると仮定した場合の記録開始点Ｐの座標位置である。

【００２６】①の場合、現在、シリンダ１に装着されているフィルム２には、空き領域が少ないので、次のフィルムに記録するため、ステップＳ２１からステップＳ２３に移行し、シリンダ１に装着されているフィルム２を排出し、ステップＳ２４で新たなフィルム２をシリンダ１に装着する。さらに、ステップＳ２５では、記録開始点Ｐを原点に変更し、ステップＳ２６で画像露光を行う。次にステップＳ２７では、次の記録画像が今回のステップＳ２６で記録された記録画像と同一の主走査領域に記録されると仮定して記録開始点ＰのＸ座標Ｘｃを設定し（Ｘｃをｘ＋αとし）、さらに、主最大座標Ｙｍａｘをｙ＋βとする。ただし、記録開始点ＰのＹ座標Ｙｃ

は、変更する必要がない。

【００２７】②の場合、前回記録された記録画像が含まれる主走査領域には空き領域が少ないので、次の主走査領域に記録するためステップＳ２２からステップＳ３０に移行し、記録開始点Ｐを点（０、Ｙｍａｘ）に設定し、ステップＳ３１で画像露光を行う。ここで、主最大座標Ｙｍａｘは、前主走査領域の記録画像の主走査方向の最大座標に間隔βを加算した値である。次にステップＳ３２で、次の画像が今回のステップＳ３１で記録された記録画像と同一の主走査領域に記録されると仮定して記録開始点ＰのＸ座標Ｘｃを設定し（Ｘｃをｘ＋αとする）、さらに、主最大座標Ｙｍａｘをｙｃ＋ｙ＋βとする。ただし、記録開始点ＰのＹ座標Ｙｃは、①のケースと同様に変更する必要がない。

【００２８】③の場合、前回記録された記録画像が含まれる主走査領域と同一の主走査領域に記録するため、ステップＳ２２からステップＳ２８に移行し、座標（Ｘｃ，Ｙｃ）をそのまま記録開始点Ｐとして画像露光を行う。次にステップＳ２９で、次の画像が今回のステップＳ２９で記録された記録画像と同一の主走査領域に記録されると仮定して次の記録開始点ＰのＸ座標Ｘｃを設定し（ＸｃをＸｃ＋ｘ＋αとする）、さらに、主最大座標Ｙｍａｘとして、この主走査領域の全記録画像のうち主走査方向の最大座標に間隔βを加算したものを設定する。

【００２９】図７にステップＳ１０の縦並び処理フローの詳細を示す。縦並び処理は、ステップＳ４１～ステップＳ５２で、ステップＳ２１～ステップＳ３２の横並び処理と同様の処理を行うものであり、横並び処理フローにおけるＸ座標とＹ座標とを入れ換えたものである。ここでは、ステップＳ４１及びＳ４２で、記録開始位置が、次の３つのケースのどの場合に相当するかを判断する。この３つのケースとは、

④次のフィルムに画像を記録する場合。

【００３０】⑤前記録画像と異なる副走査領域に画像を記録する場合。

⑥前記録画像と同一の副走査領域に画像を記録する場合。

であり、式　Ｘｃ＋ｘ＞Ｌｘを満たす場合、④のケース（ステップＳ４１がＹｅｓ）、式　Ｘｃ＋ｘ≦ＬＸかつ　Ｙｃ＋ｙ＞Ｌｙを満たす場合、⑤のケース（ステップＳ４１がＮｏかつステップＳ４２がＮｏ）、式　Ｘｃ＋ｘ≦Ｌｘかつ　Ｙｃ＋ｙ≦Ｌｙを満たす場合、⑥のケース（ステップＳ４２がＹｅｓ）、とそれぞれ判断する。

【００３１】④の場合、ステップＳ４１からステップＳ４３に移行し、横並び処理フローにおける①のケースと同様にシリンダ１に装着されているフィルム２を排出し、ステップＳ４４で新たなフィルム２をシリンダ１に装着する。さらに、ステップＳ４５では、記録開始点Ｐを原点に変更し、ステップＳ４６で画像露光を行う。次にステップＳ４７では、次の画像が今回のステップＳ４６で記録された記録画像と同一の副走査領域に記録されると仮定して記録開始点ＰのＹ座標Ｙｃをｙ＋βに設定し、さらに、Ｘｍａｘをｘ＋αとする。ここで、Ｘｍａｘは、横並び処理時における主最大座標Ｙｍａｘに相当するもので、以下、副最大座標と称す。

【００３２】⑤の場合、ステップＳ４２からステップＳ５０に移行し、横並び処理フローにおける②のケースと同様に記録開始点Ｐを点（Ｘｍａｘ，０）に設定し、ステップＳ５１で画像露光を行う。ここで、副最大座標Ｘｍａｘは、前副走査領域の記録画像の副走査方向の最大座標に間隔αを加算した値である。次にステップＳ５２で、次の画像が今回のステップＳ５１で記録された記録画像と同一の副走査領域に記録されると仮定して記録開始点ＰのＹ座標Ｙｃをｙ＋βに設定し、さらに、副最大座標ＸｍａｘをＸｃ＋ｘ＋αとする。

【００３３】⑥の場合、ステップＳ４２からステップＳ４８に移行し、横並び処理フローにおける③のケースと同様に座標（Ｘｃ，Ｙｃ）をそのまま記録開始点Ｐとして画像露光を行う。次にステップＳ４９で、次の画像が同一副走査領域に記録されると仮定して記録開始点Ｐの座標（Ｘｃ，Ｙｃ）を設定し、さらに、副最大座標Ｘｍａｘとして、この副走査領域の記録画像のうち副走査方向の最大座標に間隔αを加算したものを設定する。〔他の実施例〕前記実施例では、製版用の出力機に本発明を適用したが、複数の画像を記録するプリント基板のマスクパターン用の画像出力装置等の他の画像記録装置にも本発明を適用できる。

【００３４】

【発明の効果】以上説明したとおり、本発明に係る画像記録装置では、画像の配列方向を得、得られた配列方向と画像の記録サイズとに応じて画像開始位置が定められ画像が記録媒体に記録されるので、大きさが限定された記録媒体に対して無駄なく画像を記録できる。

【図面の簡単な説明】

【図１】本発明の一実施例による画像記録装置としての製版用の出力機の斜視図。

【図２】露光部の斜視模式図。

【図３】出力機の制御ブロック図。

【図４】複数の画像の割り付け状態を説明する図。

【図５】ＣＰＵのメイン処理の制御フローチャート。

【図６】横並び処理の制御フローチャート。

【図７】縦並び処理の制御フローチャート。

【図８】複数の画像の記録サイズの一例を示す図。

【図９】画像を縦並びにしたときの説明図。

【図１０】画像を横並びにしたときの説明図。

【符号の説明】

３０　ＣＰＵ

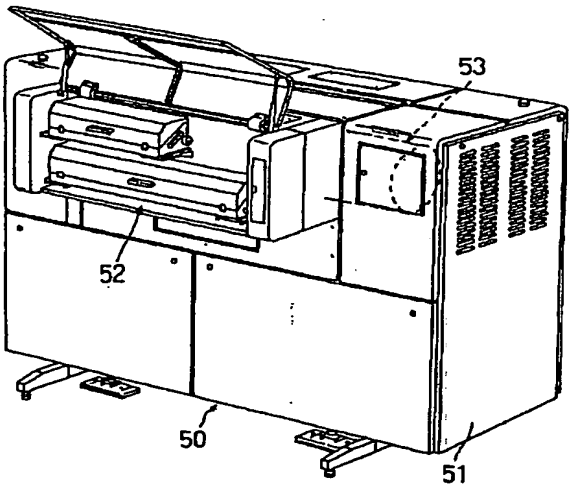
３３　操作パネル

５０　出力機

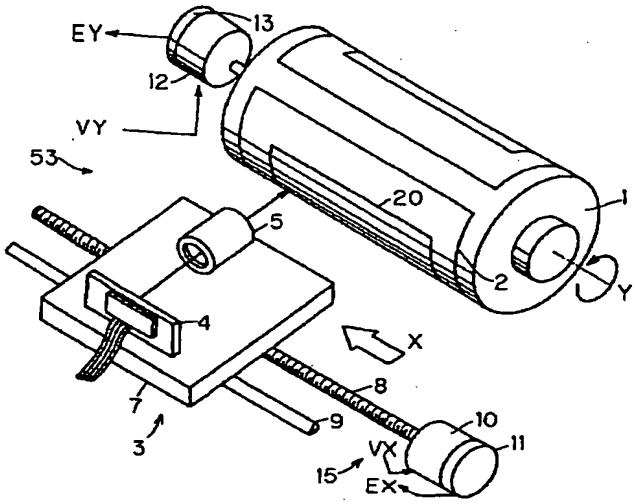
9　　10

５３　露光部

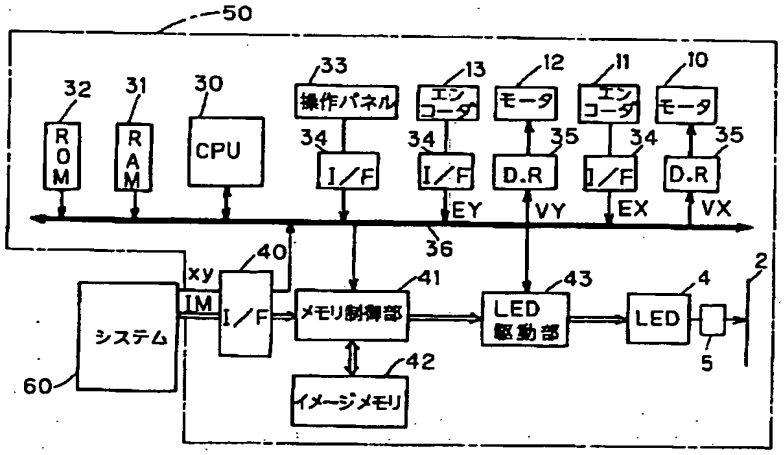
【図１】



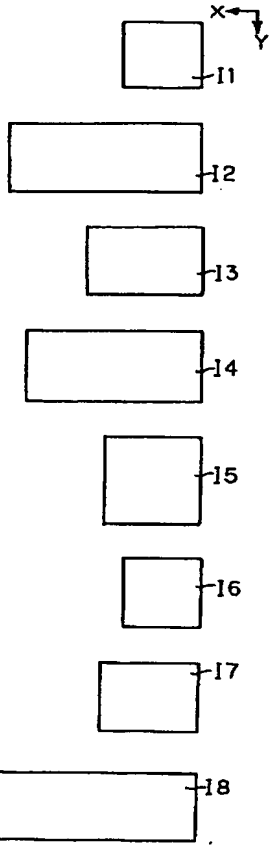
【図２】



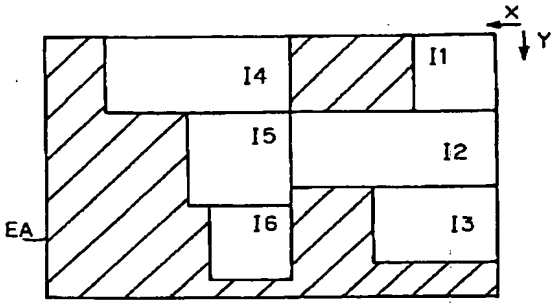
【図３】



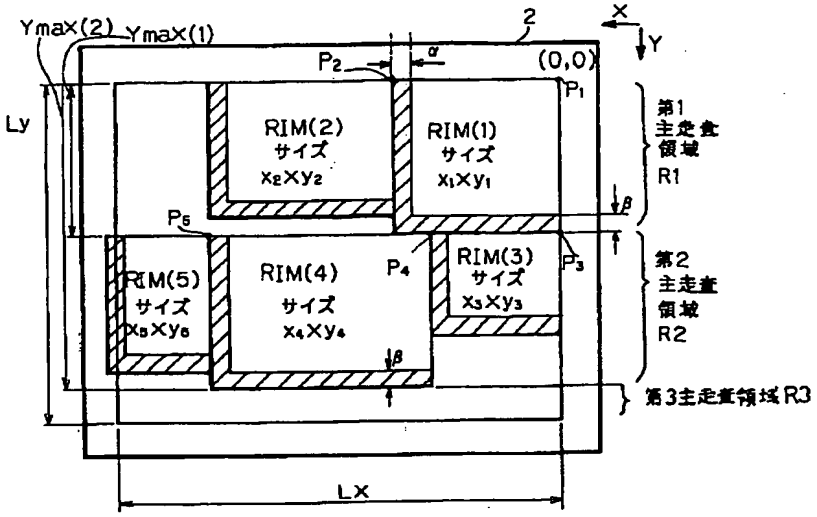
【図８】



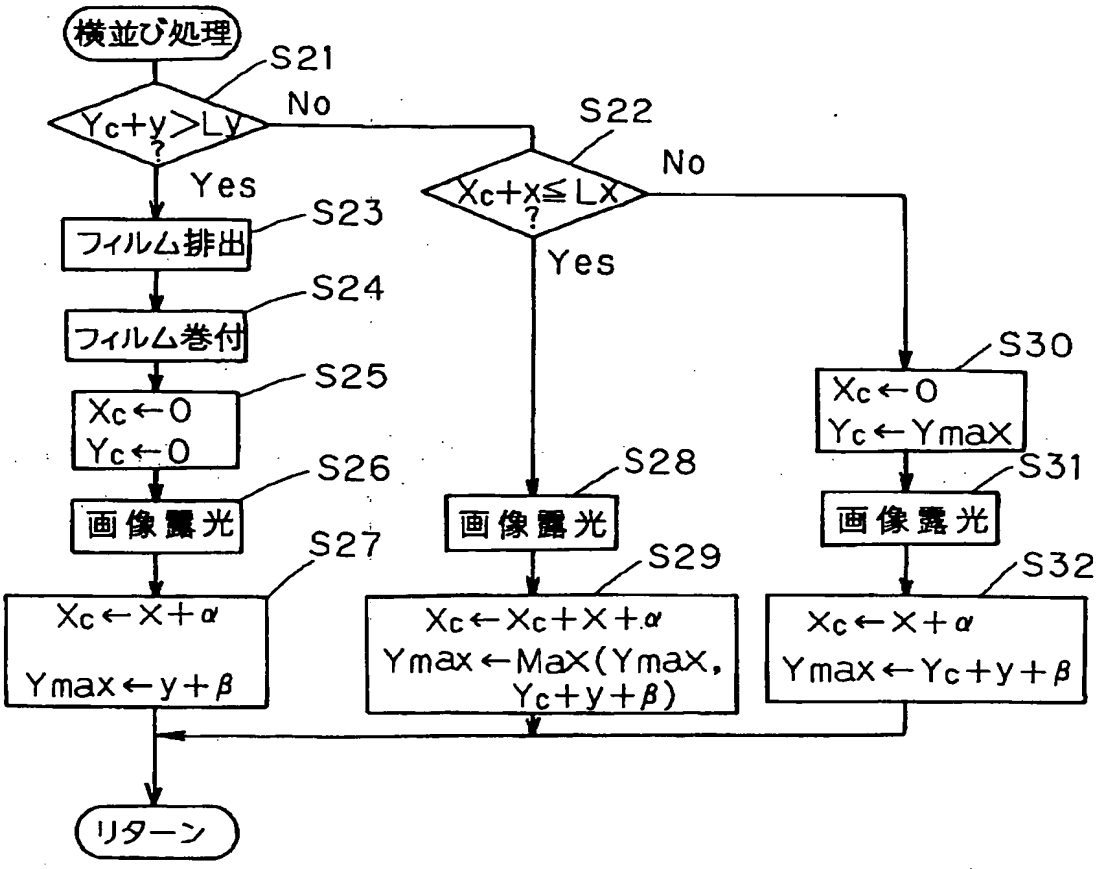
【図９】



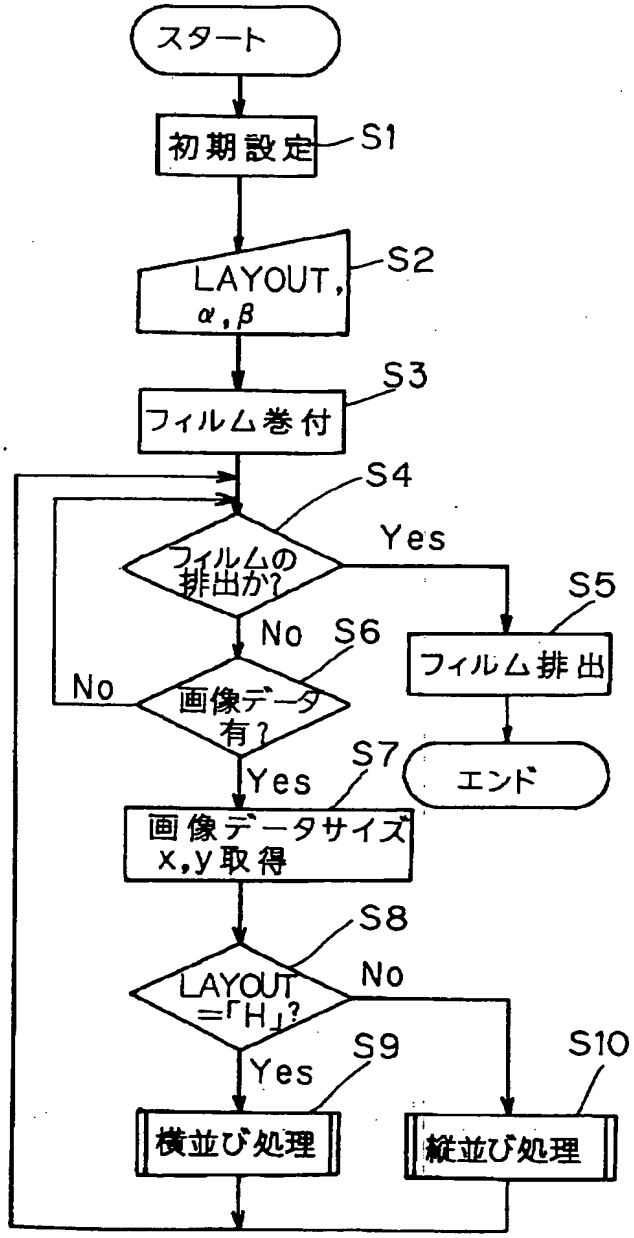
【図４】


Ymax(2)
Ymax(1)
2
X
Y
P2
α
(0,0)
P1
Ly
RIM(2)
サイズ
x2×y2
RIM(1)
サイズ
x1×y1
第1
主走査
領域
R1
β
P5
RIM(5)
サイズ
x5×y5
RIM(4)
サイズ
x4×y4
P4
RIM(3)
サイズ
x3×y3
P3
第2
主走査
領域
R2
第3主走査領域R3
Lx

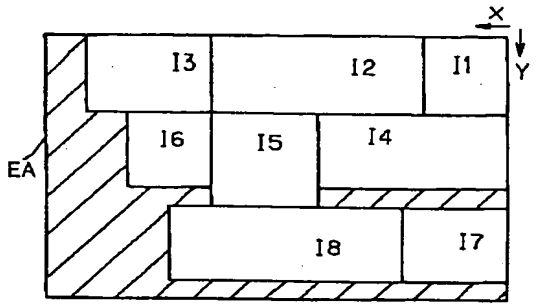
【図６】


横並び処理
S21
Yc+y>Ly
?
No
Yes
S22
Xc+x≦Lx
?
No
Yes
S23
フィルム排出
S24
フィルム巻付
S25
Xc←0
Yc←0
S26
画像露光
S27
Xc←X+α
Ymax←y+β
S28
画像露光
S29
Xc←Xc+X+α
Ymax←Max(Ymax,
Yc+y+β)
S30
Xc←0
Yc←Ymax
S31
画像露光
S32
Xc←X+α
Ymax←Yc+y+β
リターン

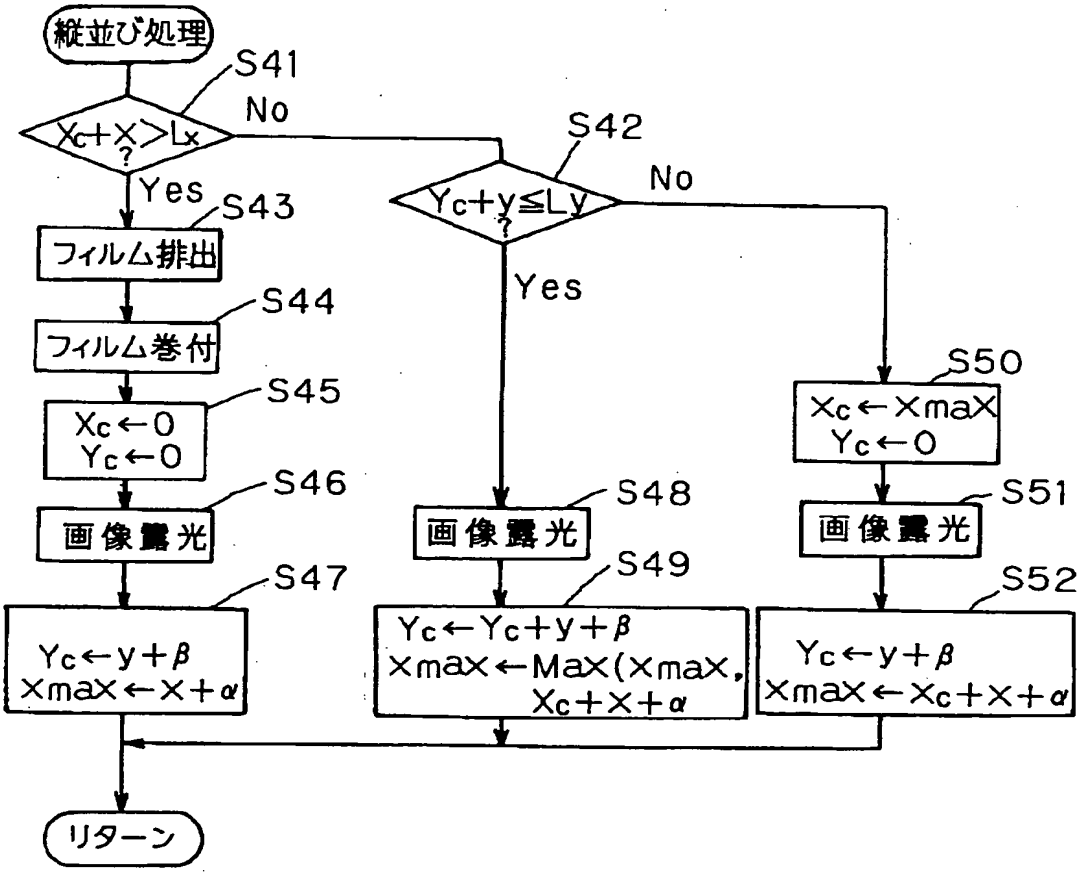
【図５】


スタート
初期設定
S1
LAYOUT,
α,β
S2
フィルム巻付
S3
S4
フィルムの
排出か?
Yes
S5
フィルム排出
No
S6
No
画像データ
有?
エンド
Yes
S7
画像データサイズ
x,y取得
S8
LAYOUT
=「H」?
No
S9
Yes
S10
横並び処理
縦並び処理

【図１０】


X
Y
EA
I3
I2
I1
I6
I5
I4
I8
I7

【図７】


縦並び処理
S41
No
Xc+X>Lx ?
Yes
S43
フィルム排出
S44
フィルム巻付
S45
Xc←0
Yc←0
S46
画像露光
S47
Yc←y+β
xmax←X+α
S42
Yc+y≦Ly ?
No
Yes
S48
画像露光
S49
Yc←Yc+y+β
xmax←Max(xmax,
Xc+X+α
S50
Xc←xmax
Yc←0
S51
画像露光
S52
Yc←y+β
xmax←Xc+X+α
リターン